Production of high added value products from egg shells

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The egg processing industry produces several tons of eggshell residues which are a major environmental problem. The acceptance of this residues by waste treatment plants is becoming more and more difficult, in addition to the fact that it represents a significant cost for the industries (0.6% sales). The main goal of this work is to produce high added-value products, namely colagen and bioactive peptides, using the remnant of collagen extraction from the eggshhell membrane. The target market of the products obtained is the biomedical, pharmaceutical, cosmetics and food industry. A major problem for the profitable utilisation of eggshell waste is to achieve the complete separation of the shell and the membrane. In order to optimize this process, the eggshhels were pasteurized at 65 ºC for 30 min. and treated, either crushed or in two halves, with three concentrations (10%, 20% and 30% volume) of acetic, chloridric and sulphuric acid. Times and yields for these diferent separation methods were calculated and the economic viability of the process was studied. Moreover, the reuse of the acid solutions was investigated. Separation times from 2h to 15 min were obtained but the yield was similiar for each one of the processes: aproximatly 100g of egg membrane are separated from 1kg of shells. The reuse of the acid solutions, as one could expect, increases the extration time so the hipothesis of adding used solutions to those freshly made must be considered in order to optimize the economics of this process. The membrane separation from the shell turned out to be a simple and economicaly viable process capable of being done in a continous reactor, which is being specially designed for this process. This continuous reactor includes a reclycling current of acids and full recover and wash of membranes making them ready for colagen and biopeptide extration.